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(54) **Surveillance device**

(57) A surveillance device (10) includes a shell (100), a sensing assembly (200) and a transparent cover (300). The transparent cover (300) is detachably disposed on the shell (100), to form an accommodating space (120) together. The sensing assembly (200) is disposed in the accommodating space (120). The transparent cover (300) comprises a first light-transmitting cover (310), an annular light baffle (320) and a second light-transmitting cover (330). The first light-transmitting cover (310) is disposed on the shell (100) and having a through hole (312a). The annular light baffle (320) disposed at the through hole (312a) has a first limiting surface (322a) and a second limiting surface (323a). The first light-transmitting cover (310) is pressed against the first limiting surface (322a). The second limiting surface (323a) faces oppositely away from the accommodating space (120). The second light-transmitting cover (330) is disposed on the annular light baffle (320) and pressed against the second limiting surface (323a). The first limiting surface (322a) and the second limiting surface (323a) prevent the second light-transmitting cover (330) from moving toward the accommodating space (120).

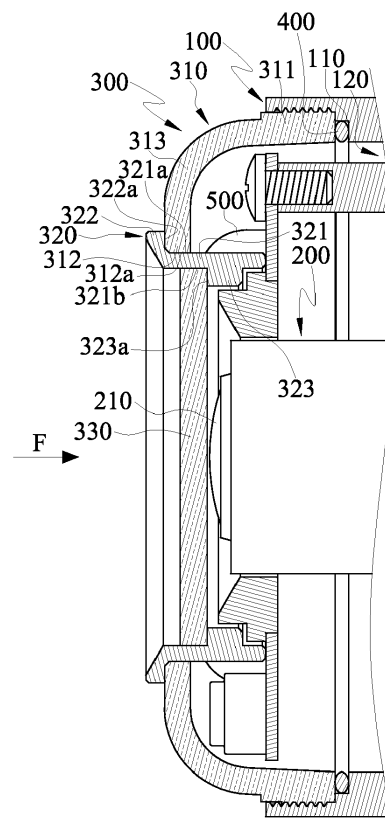


FIG.2

Description

BACKGROUND

Technical Field

[0001] The disclosure relates to a surveillance device. More particularly, the disclosure relates to a surveillance device which comprises a transparent cover with improved structures.

Background

[0002] Surveillance technology is utilized for monitoring and recording statuses of an environment, and security personnel may be replaced due to the surveillance technology. The surveillance technology combined with optical identification or alarm systems has become a main passive security system, when incidents occur in the environment, the alarm systems may generate warning signals.

[0003] The main devices of the surveillance technology are surveillance cameras. The surveillance cameras are divided into indoor cameras and outdoor cameras according to different environments to which the surveillance cameras applied. The outdoor cameras are utilized for outdoor environments, so that they have to meet the demands of being water-proof, dust-proof and collision-resistant. Thus, the outdoor cameras not only have to be tested about their functions of water-proof, dust-proof and collision-resistant, but also have to be processed via an IK10 impact test. However, because the surveillance cameras not yet perfectly meet the demand of collision-resistant nowadays, it is important to improve the collision-resistant ability of the surveillance cameras.

[0004] Additionally, the outdoor cameras are utilized for the outdoor environments, so the image qualities of the outdoor cameras may be worse at night due to lack of brightness. In prior art, the surveillance cameras were assembled with light sources. However, the light sources were always disposed in shells of the surveillance cameras for protection, parts of lights emitted from the light sources were baffled by the shells. To sum up, the illumination efficiencies of the surveillance cameras were poor in prior art, such that it is important to improve the illumination efficiencies of the surveillance cameras.

SUMMARY

[0005] The disclosure provides a surveillance device to improve the function of collision-resistant and the illumination efficiency of the surveillance device in prior art.

[0006] One aspect of the disclosure provides a surveillance device which comprises a shell, a sensing assembly and a transparent cover. The transparent cover is detachably disposed on the shell, to form an accommodating space together, and the sensing assembly is disposed in the accommodating space. The transparent

cover comprises a first light-transmitting cover, an annular light baffle and a second light-transmitting cover. The first light-transmitting cover is disposed on the shell and having a through hole. The annular light baffle has a first limiting surface and a second limiting surface and is disposed at the through hole. The first light-transmitting cover is pressed against the first limiting surface, and the second limiting surface faces oppositely away from the accommodating space. The second light-transmitting cover is disposed on the annular light baffle and pressed against the second limiting surface, such that the first limiting surface and the second limiting surface prevents the second light-transmitting cover from moving toward the accommodating space.

[0007] According to the surveillance device of the disclosure, the first limiting surface is pressed against a surface of the first light-transmitting cover which faces oppositely away from the accommodating space. Additionally, the second limiting surface is pressed against a surface of the second light-transmitting cover which faces the accommodating space. Thus, the first limiting surface and the second limiting surface prevent the second light-transmitting cover from moving toward the second limiting surface. Accordingly, the structural strength of the connections of the first light-transmitting cover, the annular light baffle and the second light-transmitting cover may also be improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The disclosure will become more fully understood from the detailed description given herein-below and the accompanying drawings which are given by way of illustration only and thus are not limitative of the disclosure, and wherein:

FIG. 1 is a perspective view of a surveillance device according to a first embodiment of the disclosure;

FIG. 2 is a partially sectional view in FIG. 1;

FIG. 3 is a partially enlarged view in FIG. 2;

FIG. 4 is an exploded view in FIG. 2;

FIG. 5A is a sectional perspective view of a first light-transmitting cover in FIG. 1;

FIG. 5B is a cross-sectional view of the first light-transmitting cover in FIG. 1;

FIG. 6 is a cross-sectional view of a surveillance device according to a second embodiment of the disclosure;

FIG. 7 is a perspective view of a transparent cover according to a third embodiment of the disclosure;

FIG. 8 is a perspective view of a transparent cover according to a fourth embodiment of the disclosure;

FIG. 9 is an exploded view of a transparent cover and a shell according to a fifth embodiment of the disclosure;

FIG. 10 is a partially sectional view of a surveillance device according to a sixth embodiment of the disclosure.

DETAILED DESCRIPTION

[0009] In the following detailed description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the disclosed embodiments. It will be apparent, however, that one or more embodiments may be practiced without these specific details. In other instances, well-known structures and devices are schematically shown in order to simplify the drawings.

[0010] Please refer to FIG. 1 to FIG. 4. FIG. 1 is a perspective view of a surveillance device according to a first embodiment of the disclosure. FIG. 2A is a partially sectional view in FIG. 1. FIG. 3 is a partially enlarged view in FIG. 2. FIG. 4 is an exploded view in FIG. 2. In this embodiment, the surveillance device 10 comprises a shell 100, a sensing assembly 200 and a transparent cover 300. The shell 100 may be, but not limited to, made from plastic material by injection molding or made of aluminum by die casting. The shell 100 has an annular lateral surface 111 and an annular groove 110 formed by the annular lateral surface 111. Additionally, in this embodiment, the sensing assembly 200 is a photographing assembly including a lens module 210. However, in other embodiments, the sensing assembly 200 may be a light sensing assembly.

[0011] The transparent cover 300 is detachably disposed on the shell 100, to form an accommodating space 120 together. The sensing assembly 200 is disposed in the accommodating space 120. The transparent cover 300 comprises a first light-transmitting cover 310, an annular light baffle 320 and a second light-transmitting cover 330. The first light-transmitting cover 310 has a first fixed segment 311, a second fixed segment 312 and a bending segment 313. The bending segment 313 is connected to and located between the first fixed segment 311 and second fixed segment 312. The first fixed segment 311 is detachably disposed on the annular lateral surface 111 of the annular groove 110. In this embodiment, the first fixed segment 311 is screwed to the annular lateral surface 111. In other words, a surface of the first fixed segment 311, which face the annular lateral surface 111, and the annular lateral surface 111 both have screw threads, so that the first fixed segment 311 may be detachably screwed to the corresponding annular groove 110. However, in other embodiments, the shell 100 may not have the annular groove 110. In other words,

a screw thread is formed at the inner wall surface 111 of the shell 100, and the first fixed segment 311 is directly screwed to the inner wall surface 111 of the shell 100. Additionally, the second fixed segment 312 has a through hole 312a.

[0012] Please refer to FIG. 4 to FIG. 5B. FIG. 5A is a sectional perspective view of a first light-transmitting cover in FIG. 1. FIG. 5B is a cross-sectional view of the first light-transmitting cover in FIG. 1. The bending segment 313 is bent about an annular line A as curvature centers. Specifically, each point of the annular line A indicates each curvature center of the bending segment 313 with the same radius r_1 of curvature. The annular line A is located at a side of the first light-transmitting cover 310 near the accommodating space 120. In other words, a radius r_2 of the bending segment 313 is greater than a radius r_3 of the annular line A. In this embodiment, the radius r_1 of curvature is a constant, and the bending segment 313 may be, but not limited to, bent about the annular line which is a circle as curvature centers. In other embodiments, the bending segment 313 may be bent about another annular line A with different shapes. The radius r_1 of curvature may not be a constant to form curvature with different radii. In this embodiment, the annular line A is annular (i.e., circular). In other words, the transverse plane 313a of the bending segment 313 is also annular (as shown in FIG. 5B).

[0013] The annular light baffle 320 comprises an enclosure wall 321, a first limiting part 322 and a second limiting part 323. The enclosure wall 321 is disposed at the through hole 312a and has an outer wall surface 321a and an inner wall surface 321b that is opposite to the outer wall surface 321a. The sensing assembly 200 is surrounded by the inner wall surface 321b to avoid being interfered with lateral lights such that the image quality may be maintained. The first limiting part 322 is connected to the outer wall surface 321a and has a first limiting surface 322a. The first limiting surface 322a is in contact with the first light-transmitting cover 310 and faces toward the accommodating space 120. The second limiting part 323 is connected to the inner wall surface 321b and has a second limiting surface 323a. The second limiting surface 323a faces oppositely away from the accommodating space 120 (i.e., faces outward). Additionally, in this embodiment (as shown in FIG. 3), an included angle θ is formed between a normal direction N_1 of the first limiting surface 322a and a normal direction N_2 of the second limiting surface 323a. The included angle θ is greater than 90 degrees and less than or equal to 180 degrees. In FIG. 3, only one included angle θ may be shown at a side of the surveillance device 10. In other embodiments, the included angle θ , which is greater than 90 degrees and less than or equal to 180 degrees, may be shown at another side of the surveillance device 10. The second light-transmitting cover 330 is located in a space surrounded by the inner wall surface 321b. A surface of the second light-transmitting cover 330 which faces the accommodating space 120 is in contact with the second

limiting surface 323a.

[0014] In this and other embodiments, the surveillance device 10 further comprises a sealing ring 400. The sealing ring 400 is interposed between the first fixed segment 311 of the first light-transmitting cover 310 and the annular groove 110.

[0015] In this and other embodiments, the surveillance device 10 further comprises a light source assembly 500. The light source assembly 500 is disposed in the accommodating space 120 and located between the enclosure wall 321 and the bending segment 313. Additionally, the light source assembly 500 is surrounded by the bending segment 313, and the enclosure wall 321 is located between the sensing assembly 200 and the light source assembly 500. Accordingly, lights emitted from the light source assembly 500 may not be baffled by the shell 100, thus the illumination efficiency of the light source assembly 500 is increased, and the sensing quality of the sensing assembly 200 would not be interfered.

[0016] The first light-transmitting cover 310, the annular light baffle 320 and the second light-transmitting cover 330 may be screwed or adhered together. Additionally, the structural strength of the connections of the first light-transmitting cover 310, the annular light baffle 320 and the second light-transmitting cover 330 may be enhanced by the first limiting surface 322a and the second limiting surface 323a that are pressed against each other.

[0017] Furthermore, the material of the first light-transmitting cover 310 may be plastic, and the material of the second light-transmitting cover 330 may be plastic or glass with high transmittance. Because the function of the elastic deformation of plastic is better than that of the glass, when the transparent cover 300 is collided with other objects, the first light-transmitting cover 310 made from plastic may buffer the external force produced by the object easily rather than the first light-transmitting cover 310 made of glass.

[0018] In this embodiment, the transparent cover 300 is the combination of the first light-transmitting cover 310, the annular light baffle 320 and the second light-transmitting cover 330. Because the structural strength of the connections of these three components are weaker than other parts, when the transparent cover 300 is collided with other objects, the connections of the three components are broken first. To improve the collision-resistance of the transparent cover 300 and the structural strength of the connections of each component, the transparent cover 300 provides the first limiting part 322 disposed at the connections of the first light-transmitting cover 310, and provides the second limiting part 323 disposed at the connections of the annular light baffle 320 and the second light-transmitting cover 330.

[0019] As shown in FIG. 2, when the transparent cover 300 is applied with an external force F toward the accommodating space 120, a surface of the first light-transmitting cover 310, which faces oppositely away from the accommodating space 120, is pressed against the first limiting surface 322a of the annular light baffle 320, to

prevent the annular light baffle 320 and the second light-transmitting cover 330 pressed against the second limiting surface 323a from moving toward the accommodating space 120 relative to the first light-transmitting cover 310. Meanwhile, a surface of the second light-transmitting cover 330 which faces toward the accommodating space 120 is pressed against the second limiting surface 323a of the annular light baffle 320, to prevent the second light-transmitting cover 330 from moving toward the accommodating space 120 relative to the annular light baffle 320. Because the first limiting surface 322a and the second limiting surface 323a are pressed against the first light-transmitting cover 310 and the second light-transmitting cover 330, respectively, the structural strength and the collision-resistance of the transparent cover 300 may be improved.

[0020] Furthermore, in this embodiment, the first light-transmitting cover 310 is made of plastic with the function of the elastic deformation, so that the bending segment 313 of the first light-transmitting cover 310 performs similar to a flexible arm. Accordingly, when the transparent cover 300 is collided with other objects, the bending segment 313 may buffer the external force easily to improve the collision-resistance of the transparent cover 300.

[0021] Please refer to FIG. 6 which is a cross-sectional view of a surveillance device according to a second embodiment of the disclosure. Because this embodiment is similar to the first embodiment in FIG. 1, only the difference between this embodiment and the first embodiment will be described as follows. In this embodiment, the surveillance device 10 further comprises a fixed ring 600. The first light-transmitting cover 310 and the first fixed segment 311 are detachably disposed in the accommodating space 120 formed by the annular groove 110. The fixed ring 600 is detachably affixed to the annular lateral surface 111 of the annular groove 110. The first fixed segment 311 is interposed between the fixed ring 600 and the annular groove 110. The difference between this embodiment and the first embodiment in FIG. 1 is that the surface of the first fixed segment 311 which faces toward the annular lateral surface 111 does not have screw threads.

[0022] Please refer to FIG. 7 and FIG. 8. FIG. 7 is a perspective view of a transparent cover according to a third embodiment of the disclosure. FIG. 8 is a perspective view of a transparent cover according to a fourth embodiment of the disclosure. Since the third embodiment in FIG. 7 is similar to the first embodiment in FIG. 1, only the difference between the third embodiment and the first embodiment will be described as follows. As shown in FIG. 7, the transverse plane of the bending segment 313 is square in this embodiment. Accordingly, the annular line A of the bending segment 313 is square.

[0023] As shown in FIG. 8, since the third embodiment in FIG. 7 is similar to the fourth embodiment in FIG. 8, only the difference between the third embodiment and the fourth embodiment will be described as follows. In the fourth embodiment, the annular light baffle 320 and

the second light-transmitting cover 330 are both square.

[0024] Please refer to FIG. 9 which is an exploded view of a transparent cover and a shell according to a fifth embodiment of the disclosure. Since this embodiment is similar to the third embodiment in FIG. 7, only the differences between this embodiment and the first embodiment will be described as follows. In this embodiment, the surveillance device 10 further comprises a plurality of fixed components 700. The shell 100 has a plurality of first fixing holes 130. The first fixed segment 311 of the transparent cover 300 has a plurality of second fixing holes 311a. The plurality of fixed components 700 are detachably affixed to the plurality of first fixing holes 130 through the plurality of second fixing holes 311a, respectively.

[0025] Please refer to FIG. 6 and FIG. 10. FIG. 10 is a partially sectional view of a surveillance device according to a sixth embodiment of the disclosure. Because the sixth embodiment in FIG. 10 is similar to the second embodiment in FIG. 6, only the differences between the second embodiment and the sixth embodiment will be described as follows. In this embodiment, the surveillance device 10 further comprises a fixed ring 600. The shell 100 has an annular groove 110. The first light-transmitting cover 310 has a first fixed segment 311, a second fixed segment 312 having the through hole 312a, and a plate segment 314. The plate segment 314 is connected to and located between the first fixed segment 311 and second fixed segment 312. The fixed ring 600 is detachably affixed to the annular groove 110. The first fixed segment 311 is interposed between the fixed ring 600 and the annular groove 110. The second fixed segment 312 is pressed against the first limiting surface 322a. The light source assembly 500 is covered by the plate segment 314. In other words, the difference between the second embodiment in FIG. 6 and this embodiment is that the bending segment 313 in FIG. 6 is replaced by the plate segment 314.

[0026] According to the surveillance device of the disclosure, the first limiting surface is pressed against the surface of the first light-transmitting cover which faces oppositely away from the accommodating space, and the second limiting surface is pressed against the surface of the second light-transmitting cover which face toward the accommodating space, such that the first limiting surface and the second limiting surface prevent the second light-transmitting cover from moving toward the accommodating space relative to the annular light baffle. Accordingly, the structural strength of the connections of the first light-transmitting cover, the annular light baffle and the second light-transmitting cover may be increased. Additionally, the function of collision-resistant of the surveillance device may also be improved.

[0027] Furthermore, the light source assembly is surrounded by the bending segment of the first light-transmitting cover, so that lights emitted from the light source assembly may not be baffled by the shell, and the illumination efficiency of the light source assembly may be

improved.

[0028] The disclosure will become more fully understood from the said embodiment for illustration only and thus does not limit the disclosure. Any modifications within the spirit and category of the disclosure fall in the scope of the disclosure.

Claims

1. A surveillance device (10), characterized by:

a shell (100);
a sensing assembly (200); and
a transparent cover (300) detachably disposed on the shell (100), to form an accommodating space (120) together, wherein the sensing assembly (200) is disposed in the accommodating space (120), and the transparent cover (300) comprises:

a first light-transmitting cover (310) disposed on the shell (100) and having a through hole (312a);

an annular light baffle (320) having a first limiting surface (322a) and a second limiting surface (323a) and disposed at the through hole (312a), wherein the first light-transmitting cover (310) is pressed against the first limiting surface (322a), and the second limiting surface (323a) faces oppositely away from the accommodating space (120); and
a second light-transmitting cover (330) disposed on the annular light baffle (320) and pressed against the second limiting surface (323a), such that the first limiting surface (322a) and the second limiting surface (323a) prevent the second light-transmitting cover (330) from moving toward the accommodating space (120).

2. The surveillance device according to claim 1, wherein the annular light baffle (320) comprises an enclosure wall (321), a first limiting part (322) having the first limiting surface (322a), and a second limiting part (323) having the second limiting surface (323a), wherein the enclosure wall (321) is disposed at the through hole (312a) and has an outer wall surface (321a) and an inner wall (321b) surface that is opposite to the outer wall surface (321a), the second light-transmitting cover (330) is surrounded by the inner wall surface (321b), the first limiting part (322) is connected to the outer wall surface (321a), the first limiting surface (322a) is in contact with the first light-transmitting cover (310) and faces toward the accommodating space (120), the second limiting part (323) is connected to the inner wall surface (321b), the second limiting surface (323a) is in con-

- tact with the second light-transmitting cover (330), an included angle is formed between a normal direction of the first limiting surface (322a) and a normal direction of the second limiting surface (323a), and the included angle is greater than 90 degrees and less than or equal to 180 degrees.
3. The surveillance device according to claim 2, further comprising a light source assembly (500) disposed in the accommodating space (120), wherein the enclosure wall (321) is located between the sensing assembly (200) and the light source assembly (500). 5
 4. The surveillance device according to claim 3, wherein the sensing assembly (200) comprises a lens module (210). 10
 5. The surveillance device according to claim 3, wherein the first light-transmitting cover (310) has a first fixed segment (311), a second fixed segment (312) having the through hole (312a), and a bending segment (313) connected to and located between the first fixed segment (311) and second fixed segment (312), the first fixed segment (311) is detachably disposed on the shell (100), the second fixed segment (312) is pressed against the first limiting surface (322a), and the light source assembly (500) is surrounded by the bending segment (313). 20 25
 6. The surveillance device according to claim 5, wherein the bending segment (313) is bent about at least one annular line as curvature centers, and the annular line is located at a side of the first light-transmitting cover (310) near the accommodating space (120). 30 35
 7. The surveillance device according to claim 5, further comprising a fixed ring (600), wherein the shell (100) has an annular groove (110), the first fixed segment (311) is detachably disposed in a space formed by the annular groove (110), the fixed ring (600) is detachably affixed to the annular groove (110), and the first fixed segment (311) is interposed between the fixed ring (600) and the annular groove (110). 40 45
 8. The surveillance device according to claim 7, further comprising a sealing ring (400) interposed between the first fixed segment (311) and the annular groove (110). 50
 9. The surveillance device according to claim 5, further comprising a plurality of fixed components (700), the shell (100) having a plurality of first fixing holes (130), the first fixed segment (311) having a plurality of second fixing holes (311a), and wherein the plurality of fixed components (700) are detachably affixed to the plurality of first fixing holes (130) through the plurality of second fixing holes (311a), respectively. 55
 10. The surveillance device according to claim 3, further comprising a fixed ring (600), the shell (100) having an annular groove (110), wherein the first light-transmitting cover (310) has a first fixed segment (311), a second fixed segment (312) having the through hole (312a), and a plate segment (314) connected to and located between the first fixed segment (311) and second fixed segment (312), wherein the fixed ring (600) is detachably affixed to the annular groove (110), the first fixed segment (311) is interposed between the fixed ring (600) and the annular groove (110), the second fixed segment (312) is pressed against the first limiting surface (322a), and the light source assembly (500) is covered by the plate segment (314).

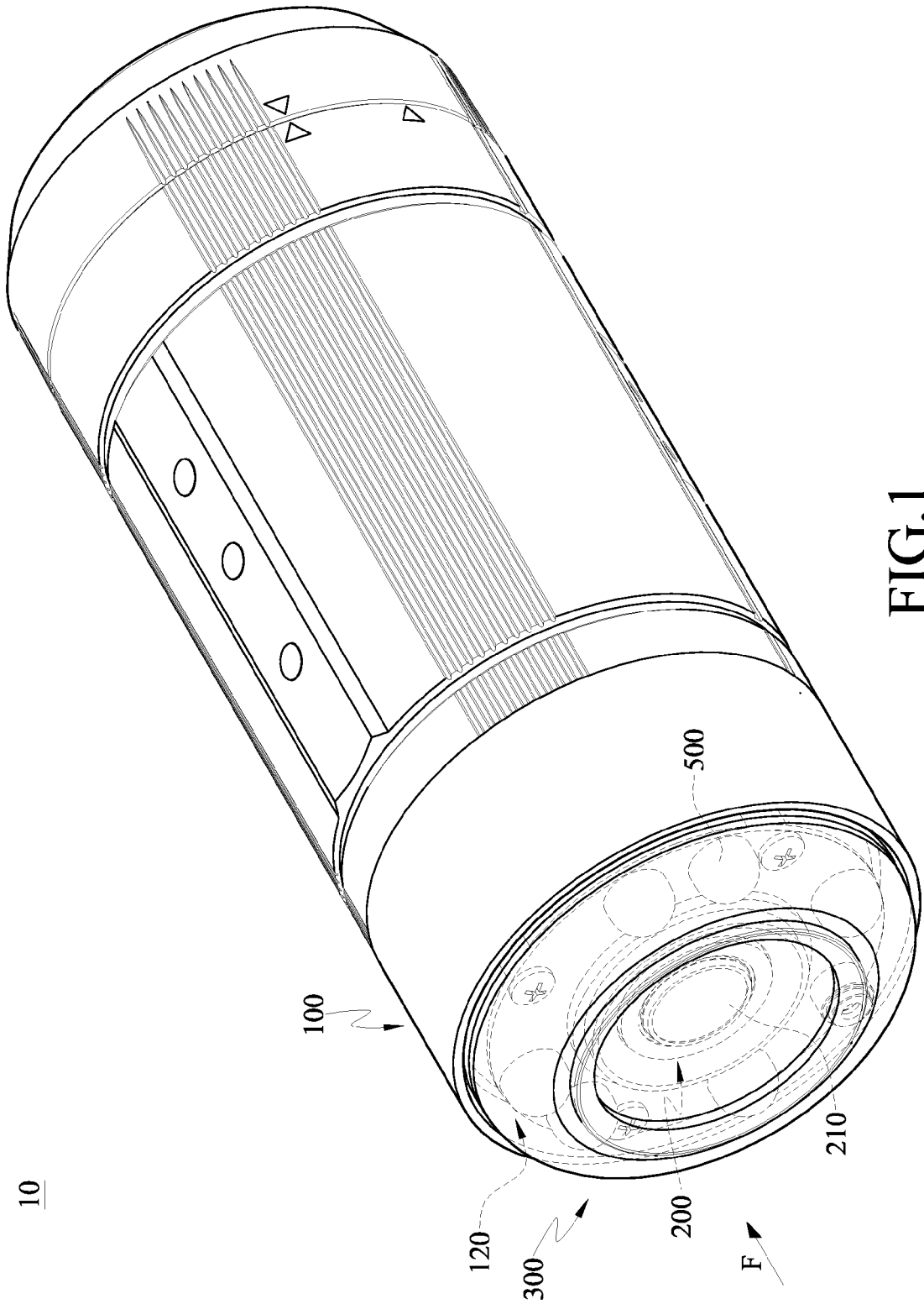


FIG.1

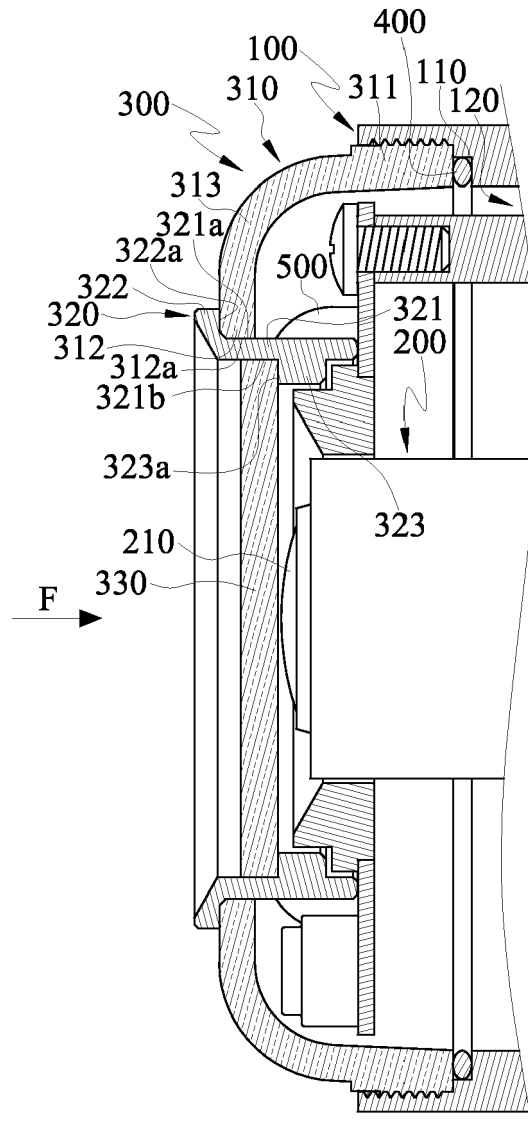


FIG.2

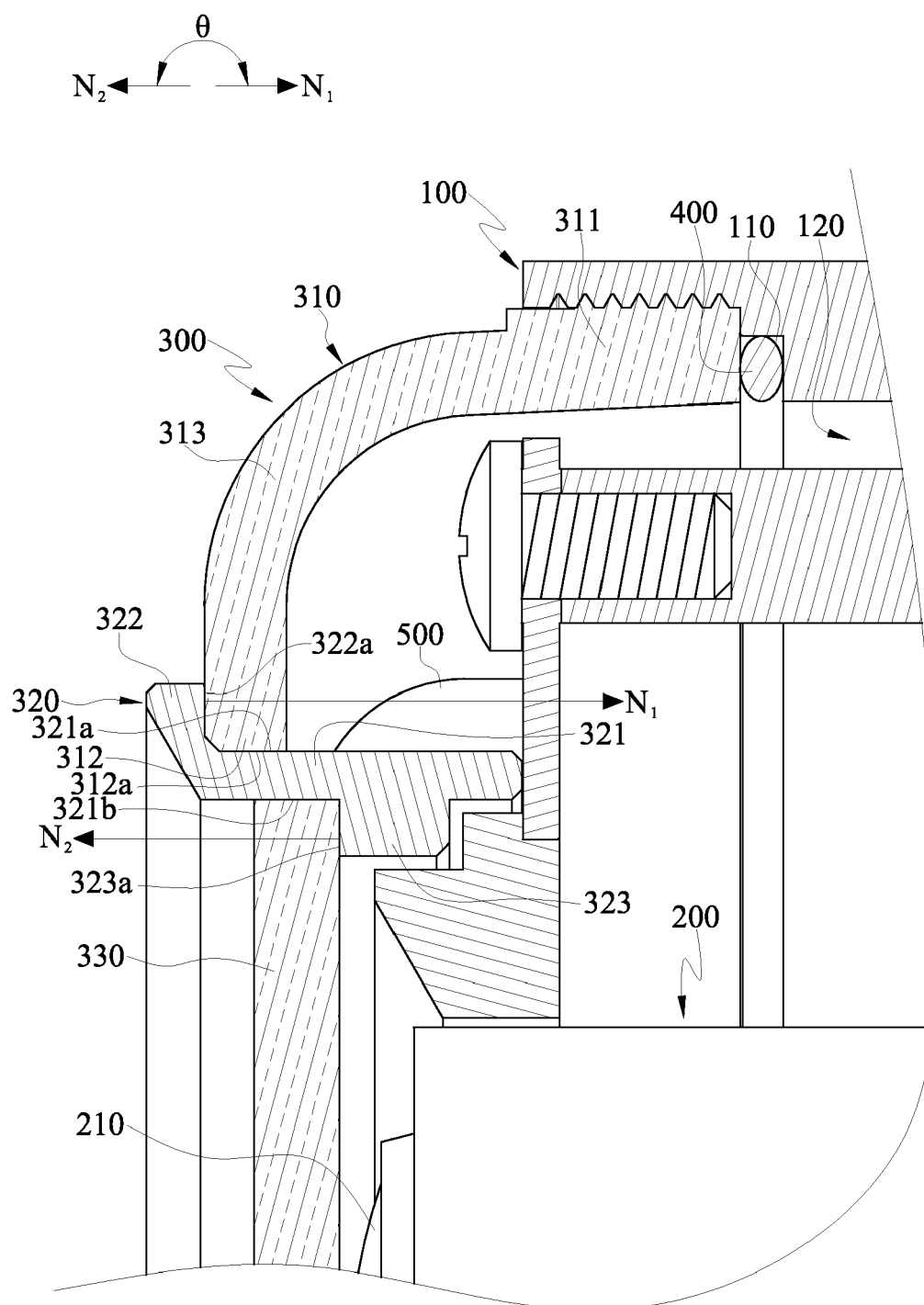


FIG.3

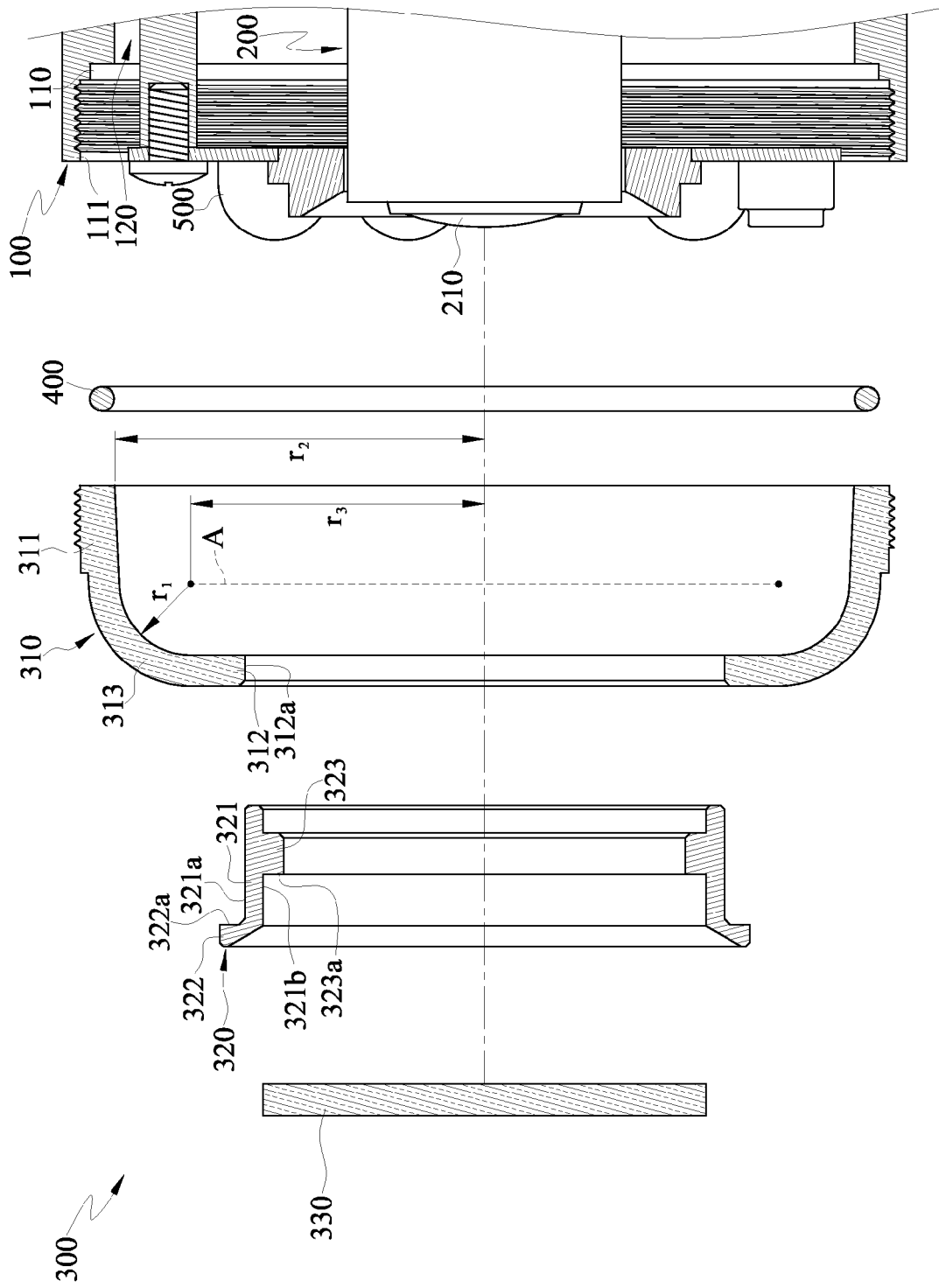


FIG.4

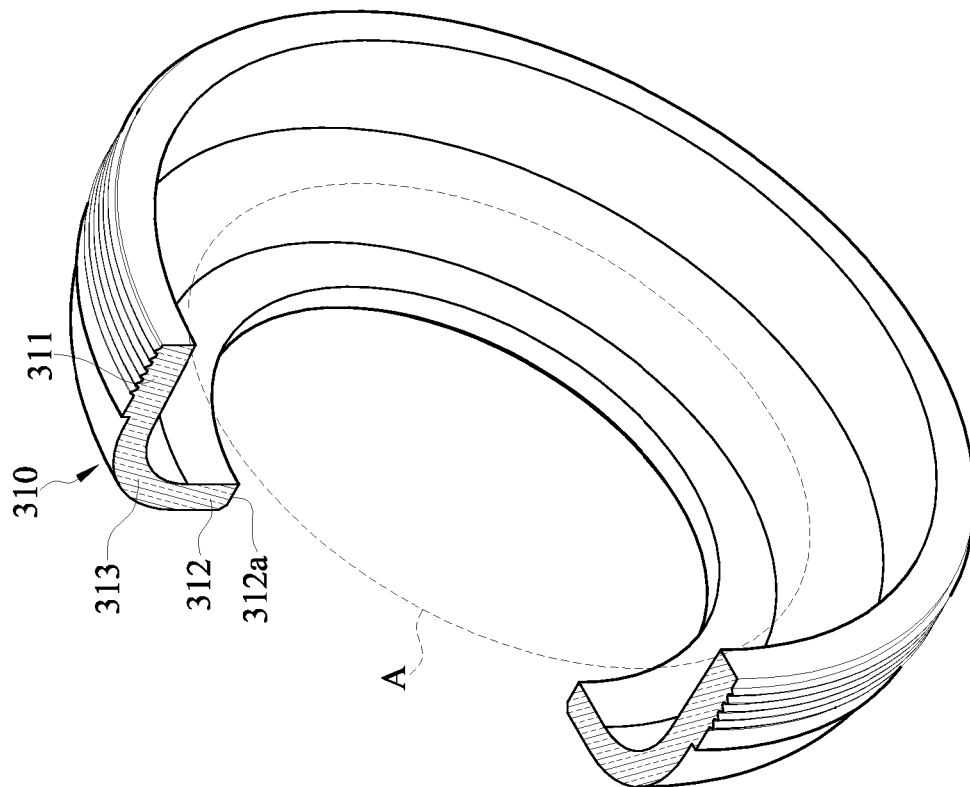


FIG. 5A

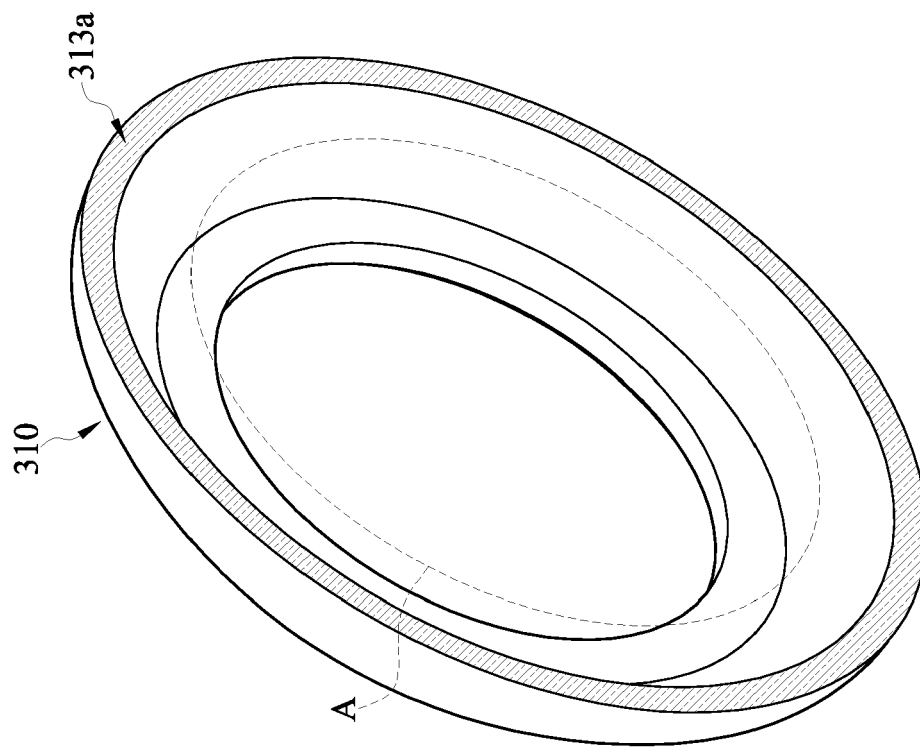
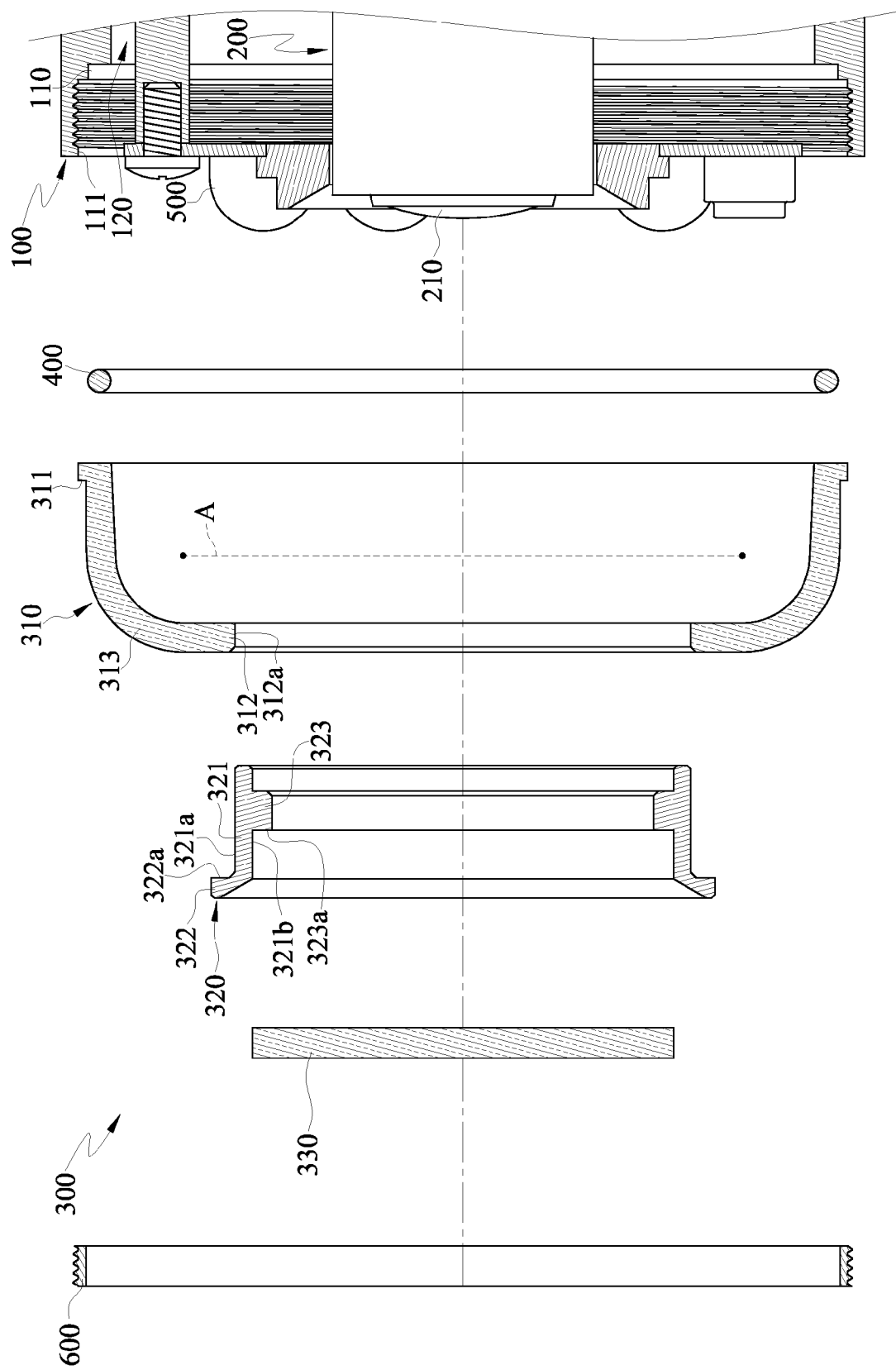


FIG. 5B



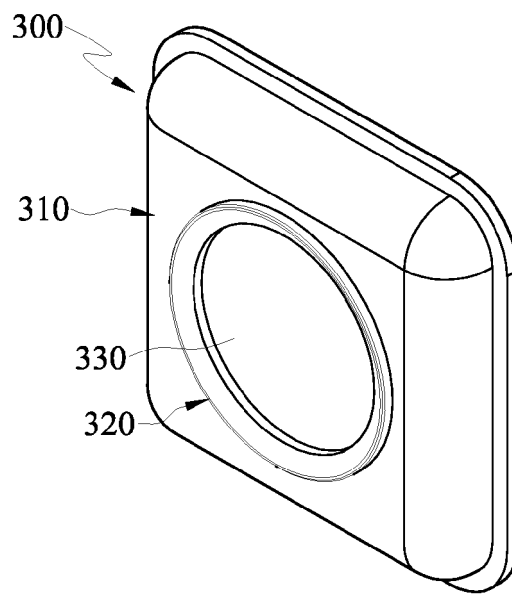


FIG. 7

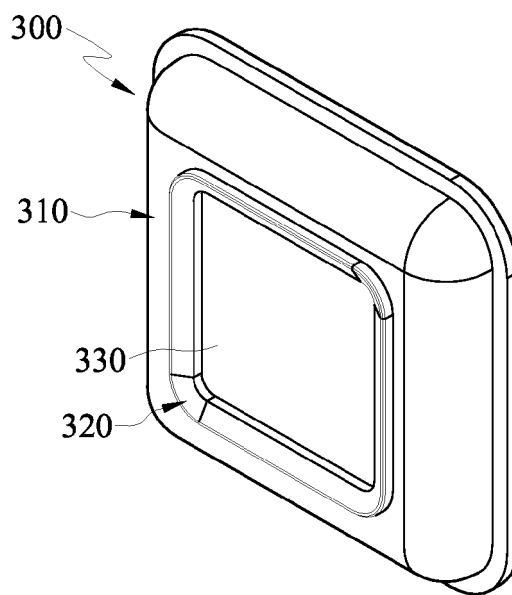


FIG. 8

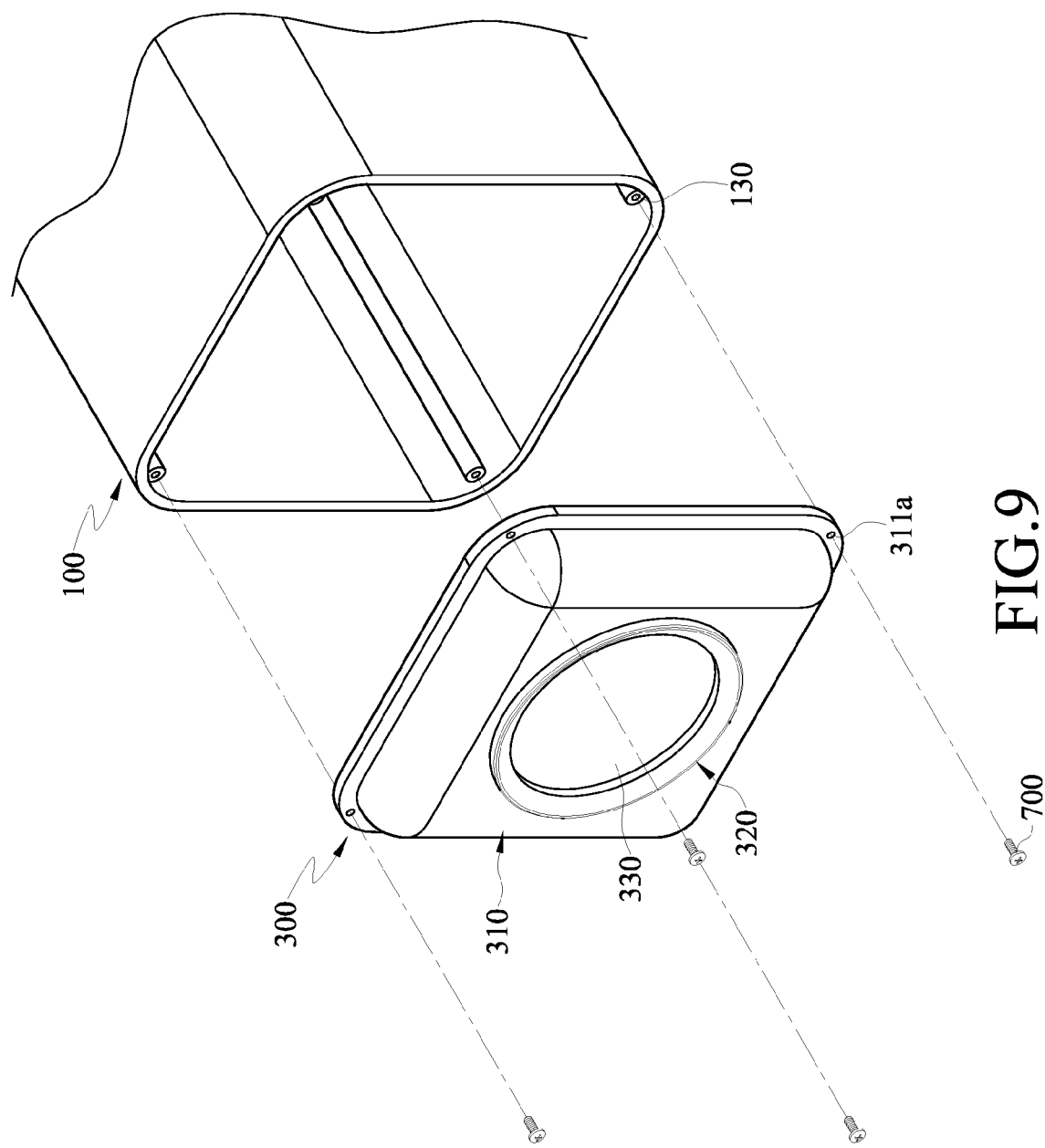


FIG.9

300

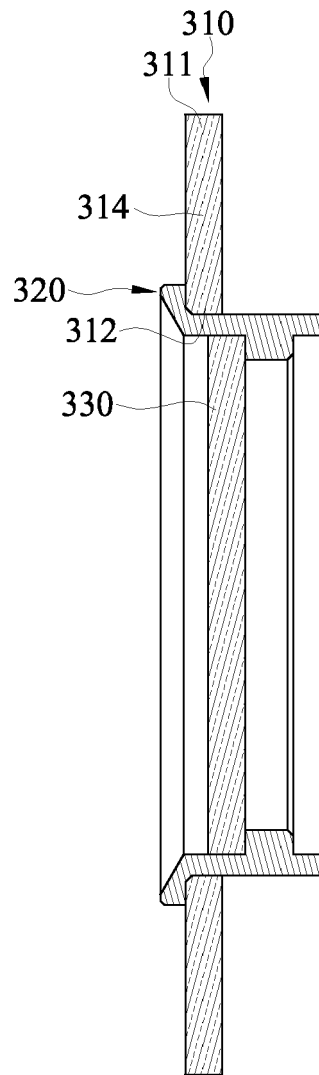


FIG.10



EUROPEAN SEARCH REPORT

 Application Number
 EP 14 18 1403

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 448 243 A2 (APPLE INC [US]) 2 May 2012 (2012-05-02)	1-4	INV. G03B17/02
Y	* paragraphs [0016] - [0026], [0069]; figures 1,3,22 *	5-10	G03B17/08 G03B17/12 G08B13/196 H04N5/225
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Y	* paragraphs [0017] - [0021]; figures 1,2,5 *	10	
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Y	* paragraphs [0029] - [0038]; figure 4 *		
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	* paragraphs [0021] - [0027]; figures 2,3A,4A,4B *		G03B G08B H04N
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 February 2015	Examiner Rückerl, Ralph
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 14 18 1403

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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12-02-2015

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